The Commonwealth of Massachusetts

DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

BAY STATE GAS COMPANY
D.T.E. 05-27

FOURTH SET OF INFORMATION REQUESTS OF THE DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY TO THE COMPANY

Pursuant to 220 C.M.R. § 1.06(6)(c), the Department of Telecommunications and Energy ("Department") submits to Bay State Gas Company ("Bay State" or "Company") the following set of Information Requests for response within ten days of issuance:

DTE 4-1 Refer to Exh. BSG/LRK-2. Please explain to what extent the present cost analysis (the cost trend analysis as well as the econometric analysis) performed for Bay State differs from the cost analysis performed for Boston Gas Company Company ("The Cost Performance of Boston Gas Company") in Boston Gas Company Company, DTE 03-40. In your explanation, please consider the potential differences between the two studies in terms of the number and nature of the endogenous and exogenous variables selected, the way the variables were defined (i.e., whether or not pensions were included in the price of labor), and of the approach used to estimate the equations.

DTE 4-2 Refer to Exh. BSG/LRK-2. If the gas utility industry is a capital intensive industry, explain the reasons for conducting a cost trend analysis and an econometric cost study for Bay State based on O&M costs only, and not including capital costs. To what extent do the cost trend analysis and the econometric cost study give a complete analysis/overview (as opposed to a partial analysis/overview) of the overall cost performance of Bay State during the study period?

DTE 4-3 Refer to Exh.BSG/LRK-2, at 5. The Company states that the pension costs were excluded since these are largely beyond management control and vary greatly. Please:

(a) provide the average percentage of pension expense with respect to the total wages;

(b) indicate whether pensions are included in the labor input price of the productivity study (in the input price differential section of the study). If yes,

please explain the rationale for including the pensions in the productivity study and excluding them in the cost analysis. How is the price-cap index affected by the "inclusion" and "exclusion" of pensions?

(c) indicate whether pensions were included in the "cost trend analysis";

(d) indicate whether the labor input price is an exogenous variable in the model. If yes, please explain, in view of the argument that pensions are beyond the Company's control, why the Company excluded pensions from the labor input price.

DTE 4-4 Refer to Exh.BSG/LRK-2. Regarding the time series data used in the cost analysis ("cost trend" and "econometric cost" analyses), please:

(a) explain why the Company did not include the test year 2004;

(b) explain why the Company chose the time series 1994-2003;

(c) explain why the "cost trend analysis" performed by the Company covers a different period of time from the period used in the econometric cost analysis;

(d) explain why the Company did not consider the time series 1993-2004 for its entire cost analysis;

(e) did the Pacific Economic Group ("PEG") perform the econometric cost analysis presented in Boston Gas Company Company, DTE 03-40 using the time series 1993-2000? Why did the Company not consider the year 1993 in the present econometric cost study?

DTE 4-5 Refer to Exh.BSG/LRK-2. Regarding the econometric cost modeling:

(a) did the Company detect any structural change in the data for any of the gas distributors in the sample? Did the Company perform any test for structural change?

(b) specifically, did the Company test for any structural change in Bay State data? If yes, please present the results. If no, please explain why not;

(c) how did the Company account for Bay State's rate freeze period?

(d) the Company concluded that Bay State's O&M cost grew by 3.9% per annum on average over the 1993-98 period and that the O&M cost declined by an average of 2.2 % per annum over the 1999-2003 period (see p. 9 of Exh.BSG/LRK-2). Based on these findings, would the Company conclude that there has been a cost trend change for Bay State?

(e) explain how the Company captured the cost trend change detected in the "cost trend" analysis and how that cost trend change is linked to the setting of the consumer dividend.

DTE 4-6 Refer to Exh.BSG/LRK-2, at 5. The Company states that guided by economic theory, it developed a mathematical model in which the O&M cost of distribution is a function of some of the business conditions. Please discuss how, if any, the results (major conclusions) of the econometric study would change by estimating

a different system of equations based on the average cost function (total costs/number of customers) instead of the total cost function.

DTE 4-7 Refer to Exh.BSG/LRK-2 at 13. The Company states that a short run cost function was specified and that economic theory was used to guide the development of the cost model. In this regard, please explain the following:

(a) why was the Company interested in estimating a short run cost function and not a long run?
(b) define short run cost function and long run cost function;
(c) what input has the Company considered to be constant in the short run? Is that input represented in the right hand side of the cost function equation? If not, why not.

DTE 4-8 Refer to Exh.BSG/LRK-2, at 13 wherein the Company defines the equation [1]. In that equation, the Company included the efficiency factor :"Ln efficiency" term. Please:

(a) explain what kind of efficiency the Company refers to (i.e., productive efficiency, allocative efficiency, technological change);
(b) discuss the meaning of having an efficiency factor ("Ln efficiency") equal to zero, positive or negative;
(c) assume that the efficiency factor is negative. Please explain under which circumstances the actual cost of the Company could be less than the theoretical minimum.

DTE 4-9 Refer to Exh.BSG/LRK-2, at 14. The Company states that it is customary to assume a specific probability distribution for the error term. In this regard, please:

(a) indicate the probability distribution function, the mean and variance of that function that the Company assumed;
(b) state the implications for hypothesis testing of assuming that particular probability distribution;
(c) is the probability distribution choice compatible with the sample size used in the study? If yes, why? If not, why not.

DTE 4-10 Refer to Exh.BSG/LRK-2. Please re-run the econometric cost model considering:

(a) total cost (including capital, labor, and other O&M costs);
(b) pensions in the labor input price;
(c) "the rate freeze" factor;
(d) the period 1993-2004
(e) based on the new results, please update Exh.BSG/LRK-2;

(f) based on the new results, would the Company propose a new consumer dividend? If yes, why? If not, why not?

DTE 4-11 Please provide on disk in Excel format all data and supported formula used in the estimation of the econometric cost study and discuss any data errors and how the Company dealt with them. In addition, please provide the input and output printout stemming from the econometric software.

DTE 4-12 Please present evidence that the main drivers of total cost variations in the "total cost trend analysis" are as a consequence of the input quantity variations and not input price variations and/or output quantity variations.

DTE 4-13 Refer to Exh.BSG/LRK-2, at 6. The Company states that Bay State faces high prices for labor services. Please discuss with respect to what or whom the Company is comparing Bay State's labor prices.

DTE 4-14 Refer to Exh.BSG/LRK-2, at 7. Please explain the following sentence: "Because it was necessary for O&M costs to be defined comparably over this entire period to undertake an "apples to apples" O&M cost trend comparison, O&M costs associated with the LDAC tracker mechanism for 2002 and 2003 were netted out of those years."

DTE 4-15 Referring to the econometric cost model, please specify, for each of the variables, the source(s) of the data used in the cost research. Please discuss whether two different sources were ever necessary to complete the data set for a single variable. It yes, please explain the degree of homogeneity of the two data sets stemming from different sources.

DTE 4-16 Referring to the econometric cost model, please:

(a) discuss what the Company used the model for;

(b) show that the model estimation techniques follow standard econometric practice in estimating the parameters of an econometric cost model. Please provide copies of any published articles, papers, reports, or book chapters in support of your answer;

(c) show that the model selection techniques follow standard econometric practice in selecting variables for inclusion in an econometric cost model (i.e., having two quantity variables in the cost function). Provide copies of any published articles, papers, reports, or book chapters in support of your answer;

(d) justify the selection (advantages and disadvantages) of the a translog functional form (instead of other potential functional forms such as Cobb-Douglas or any of the Generalized Leontief cost functions) in view of the goal of the Company (keep in mind you answer in part A of this question);

(e) indicate whether the Company has tried to fit a different functional cost function. If yes, please present all workpaper, and supporting documentation. If not, why not?

DTE 4-17 Referring to the econometric cost model, please:

(a) indicate the computer software used to estimate the regressions;

(b) indicate the level of statistical significance of the estimates selected by the Company to determine whether an independent variable has explanatory power;

(c) state the underlying assumptions of the approach (Feasible Generalized Least Squares) used by the Company to estimate the system of equations, and explain how the Company tested these assumptions to ensure that none of them are violated. Please, provide evidence to support your answer;

(d) specify which tests were performed in the econometric analysis to detect multicollinearity in the data, to detect serial autocorrelation and heteroskedasticity. Please provide evidence in support of your answer;

(e) indicate under which assumptions the estimates of the coefficients could be considered "unbiased". Are those assumption fulfilled?

DTE 4-18 Referring to the econometric cost analysis, please:

(a) indicate which cost share equation will be dropped from the system;

(b) specify the number of parameters to be estimated;

(c) identify the exogenous and endogenous variables of the system.

DTE 4-19 Refer to Exh. BSG/LRK-2, at 15. The Company assumes that the error term of the cost equation ("equation [3]") is random and that it includes two components: the error term of the minimum total cost function and the Company's efficiency factor differential from the sample norm. In this regard, please:

(a) indicate if the following expression is correct:
$e = u + (\ln \text{efficiency} - \ln \text{efficiency}^{\text{average}})$

(b) if yes, please discuss how the Company distinguishes between the term "u" and the term "(ln efficiency - ln efficiency$^{\text{average}}$) as responsible for the variation in "e" (or the difference between the predicted cost and the actual cost).

DTE 4-20 Refer to Exh. BSG/LRK-2. Please provide a copy of the study on "The Cost Performance of Boston Gas Company" which the Pacific Economic Group ("PEG") submitted in D.T.E. 03-40 as Exh. KEDNE/LRK-3.

DTE 4-21 Refer to Exh. BSG/LRK-2. Please indicate whether the cost trend analysis and the econometric cost study for Bay State distinguished between distribution and non-distribution labor and O&M expenses. If not, explain why not? Also, explain what effect, if any, the failure to distinguish between distribution and non-distribution labor O&M expenses would have on the results of the cost trend

analysis and the econometric cost analysis for Bay State, on the conclusions regarding the Company's cost performance during the study period.

DTE 4-22 Refer to Exh. BSG/LRK-2. Please indicate whether the cost trend analysis and the econometric cost study for Bay State controlled for the NiSource merger/acquisition-related savings. If not, explain? Also, explain what effect, if any, that the failure to control for the NiSource merger/acquisition-related savings would have on the results of the cost trend analysis and the econometric cost study for Bay State, and on the conclusions regarding the Company's cost performance during the study period.

DTE 4-23 Refer to Exh. BSG/LRK-2. Please list all the implicit and explicit assumptions underlying the cost trend analysis and the econometric cost study for Bay State. Discuss how a violation of each assumption could affect the results of the cost trend analysis and the econometric cost study and the conclusions regarding the Company's cost performance during the study period.

DTE 4-24 Refer to Exh. BSG/LRK-2. Please discuss the research design and the sample selection process used for the econometric cost study for Bay State. State whether the sample used for the econometric cost study is a representative sample of gas utilities in the United States. If not, explain why, and discuss how the selection of a non-representative sample could affect the results of the econometric cost study?

DTE 4-25 Refer to Exh. BSG/LRK-2. Please discuss any data or other limitations that affected the sample selection process for the econometric cost study. How did the Company address these limitations?

DTE 4-26 Refer to Exh. BSG/LRK-2. Please:

(a) indicate the cost to Bay State to conduct the Cost Trend Analysis. Show how the cost to conduct the study was calculated, with all supporting documentation;

(b) indicate the cost to Bay State to conduct the econometric cost study. Show how the cost to conduct the study was calculated, with all supporting documentation.

DTE 4-27 Refer to Exh. BSG/LRK-2. Please:

(a) explain how the consumer dividend factor was determined for Boston Gas Company in D.T.E. 03-40;

(b) discuss any similarities and differences between how the consumer dividend factor was determined for Boston Gas Company in D.T.E. 03-40 and how it has been determined for Bay State in the instant proceeding. In particular, show how the results of (i) the Cost Trend Analysis and (ii) the Econometric Cost

Study were used to determine the consumer dividend factor in the price cap formula for Bay State.

DTE 4-28 Refer to Exh. BSG/LRK-1, at 8-10. Please provide a copy of the productivity study for Boston Gas Company in D.T.E. 03-40 (Exhibit KEDNE/LRK-2 and all updates) which the Company used for the productivity and inflation differential components of the X factor proposed in the instant proceeding. Indicate all changes, modifications, corrections, updates, and/or revisions to the Boston Gas Company productivity study that the Company has performed since the issuance of the Department Order in D.T.E. 03-40.

DTE 4-29 Refer to Exh. BSG/LRK-1, at 8-10. Please:

(a) indicate the most recent year for which data are available to update the Boston Gas Company productivity study in D.T.E. 03-40;

(b) explain why, given the Department policy "to rely on the most recent information available" in the conduct of a productivity study (see, D.T.E. 03-40, at 477), the Company did not update the Boston Gas Company productivity study to include data up to the year closest to the test year for the Company's rate case filing;

(c) indicate the time period covered by the Boston Gas Company productivity study in D.T.E. 03-40. Given the time period covered by the Boston Gas Company productivity study, indicate how "old" the study was by the time the Company filed its rate case in this proceeding;

(d) discuss whether the appropriateness of using the results of the Boston Gas Company productivity study in D.T.E. 03-40 in the instant proceeding should be determined by the time period covered by the Boston Gas Company productivity study, or by the time since the issuance of the Department Order in D.T.E. 03-40.

DTE 4-30 Refer to Exh. BSG/LRK-1, at 8-10. Please:

(a) provide data on the major economic indicators for the U.S. economy and the gas industry for each year since (and including) the last year covered by the Boston Gas Company productivity study in D.T.E. 03-40;

(b) discuss any major changes in the U.S. economy and the gas industry since the completion of the Boston Gas Company productivity study in D.T.E. 03-40 which are likely to change the findings of that study;

(c) provide figures showing the most recent dating of a business cycle for the U.S. economy by the National Bureau of Economic Research ("NBER").

DTE 4-31 Refer to Exh. BSG/LRK-1, at 8-10. Please provide an estimate of how much it will cost the Company to update the Boston Gas Company productivity study in D.T.E. 03-40 to include data up to the year closest to the test year for the

Company's rate case filing. Show how the Company arrived at the cost estimate.

DTE 4-32 Refer to Exh. BSG/LRK-1, at 10-12. Please:

(a) explain the empirical basis for the proposed consumer dividend factor of 0.3 percent. Provide all documentation, workpapers, formula, computer printouts, etc. showing how the Company derived the 0.3 percent consumer dividend;

(b) what are the consumer dividend factors approved for regulated gas and electric distribution companies operating under price-cap PBR plans in Massachusetts and in other jurisdictions in recent years? Please indicate whether the utility is a gas, electric, or combined gas and electric utility, and whether the PBR plan is the company's first PBR plan or is an updated PBR plan.

DTE 4-33 Refer to Exhs. BSG/LRK-1, at 12-13 and BSG/LRK-2, at 7-9. Please:

(a) provide all documentation, workpapers, formula, computer printouts, etc. regarding the Company's O&M Cost Trend Analysis;

(b) calculate the annual dollar change in the Company's O&M costs (in nominal and real dollars) during the five-year rate freeze period (end-1998 through 2003) and the five-year period before the rate freeze took effect (1993-1998);

(c) discuss the specific areas where the Company achieved cost reductions, cost containment, and efficiency gains during the five-year rate freeze period (end-1998 through 2003) relative to the five-year period before the rate freeze took effect (1993-1998);

(d) give reasons for the slower growth of O&M costs during the rate freeze period compared to the period before the rate freeze took effect;

(e) indicate whether the O&M costs used in the cost trend analysis before and during the rate freeze period included only Bay State-specific costs or included also costs from NiSource corporate services and/or other Bay State affiliates;

(f) break down the Company's O&M costs into its various components and calculate the average annual growth rate (in nominal and real dollars) for each component before and during the rate freeze period. Present the results in tabular and graphic forms. Provide all documentation, workpapers, formula, computer printouts, etc. showing how the calculations were done;

(g) what conclusions or inferences can the Company draw from the analysis in (a)-(f) above?

DTE 4-34 Refer to Exhs. BSG/LRK-1, at 12-13 and BSG/LRK-2, at 7-9. Please:

(a) calculate the average annual growth rate of the Company's base distribution revenues (in nominal and real dollars) during the five years before the rate freeze and the five years when the rate freeze was in effect. Provide all

documentation, workpapers, formula, computer printouts, etc. showing how the calculations were done;

(b) calculate the annual dollar change in the Company's base distribution revenues (in nominal and real dollars) during the five-year rate freeze period (end-1998 through 2003) and the five-year period before the rate freeze took effect (1993-1998). Provide all documentation, workpapers, formula, computer printouts, etc. showing how the calculations were done;

(c) estimate the dollar amount (in nominal and real dollars) and the growth rate of base distribution revenues that are due to (i) increased use-per-customer, and (b) customer growth before and during the rate freeze period. Provide all documentation, workpapers, formula, computer printouts, etc. showing how the calculations were done;

(d) what conclusions or inferences can the Company draw from the results of (a), (b), and (c) above?

DTE 4-35 Refer to Exhs. BSG/LRK-1, at 12-13 and BSG/LRK-2, at 7-9. Please compare the average annual growth rate of Bay State's O&M costs (in nominal and real dollars) to the average annual growth rate of the Company's base distribution revenues during the five years before the rate freeze and the five-year period when the rate freeze was in effect.

DTE 4-36 Refer to Exhs. BSG/LRK-1, at 12-13 and BSG/LRK-2, at 7-9. Please:

(a) calculate the Output Quantity Index, the Input Quantity Index, and the Total Factor Productivity ("TFP") for Bay State using Bay State-specific data for the period 1993 through 2003 where (i) Output is measured as "Throughput", and (ii) Output is measured as "Number of Customers". Provide all worksheets, formula, etc. showing how the calculations were done, including how the variables were measured;

(b) calculate the arithmetic mean and the average annual growth rate of the Company's TFP index for (i) the period 1993 through 2003, (ii) the period before the rate freeze, and (iii) the period during the rate freeze. Provide all worksheets, formula, etc. showing how the calculations were done;

(c) calculate the arithmetic mean and the average annual growth rate of the Company's input and output quantity indexes for (i) the period 1993 through 2003, (ii) the period before the rate freeze, and (iii) the period during the rate freeze. Provide all worksheets, formula, etc. showing how the calculations were done;

(d) what conclusions or inferences can the Company draw regarding Bay State's total factor productivity performance, and the Company's input and output growth trends before and during the rate freeze period?

DTE 4-37 Refer to Exh. BSG/LRK-1, at 7-8. Please explain the differences, if any, between a "rate freeze plan", a "performance-based regulation plan", and a "rate indexing performance-based regulation plan".

DTE 4-38 Refer to Exh. BSG/LRK-1, at 7-8 and 11-12. Reconcile the Company's position that because Bay State "operated for more than five years under an alternative to traditional cost of service regulation that created strong performance incentives, the Company's "situation is analogous to Boston Gas Company's at the expiration of its initial PBR plan" with the Company's argument that a five-year term for the proposed PBR plan is appropriate because it is "consistent with Department precedents for gas distribution companies that are proposing rate indexing PBR plans for the first time."

DTE 4-39 Refer to Exh. BSG/LRK-1, at 7-8 and 11-12. If Bay State's "situation is analogous to Boston Gas Company's at the expiration of its initial PBR plan", and the Company, "like Boston Gas Company, is effectively updating a type of performance-based regulation plan", as the Company has argued, would that not justify a term of ten-years for the Company's proposed PBR plan so that it is consistent with recent Department precedents in Boston Gas Company Company, D.T.E. 03-40 and Berkshire Gas Company, D.T.E. 01-56?

DTE 4-40 Refer to Exh. BSG/LRK-1, at 7-8 and 11-12. Discuss the advantages and disadvantages of a five-year PBR plan versus a ten-year PBR plan for a regulated gas utility like Bay State in terms of the following:
(i) creating an environment that allows for medium and long-term efficiency planning and business decision-making;
(ii) providing a stronger incentive for companies to achieve efficiency gains and significant cost savings through innovation, deployment of productivity-enhancing technology, and other measures;
(iii) reducing the regulatory and administrative burdens of implementation; and
(iv) exposing the Company to market and/or other risks.

DTE 4-41 Refer to Exh. BSG/LRK-1, at 7-8 and 17-18. Please discuss how the Z-factor and earnings sharing mechanism ("ESM") proposed by the Company mitigate any market and/or other risks that shareholders and ratepayers may face if the Department approved a ten-year PBR plan for the Company.

DTE 4-42 Refer to Exh. BSG/LRK-1, at 11-12. Please discuss the likely benefits of the proposed PBR plan to the Company's ratepayers and shareholders compared to traditional cost of service regulation. In particular, demonstrate that ratepayers are not likely to pay more under the proposed PBR plan than they would have under a traditional cost of service regulation.

DTE 4-43 Refer to Exh. BSG/LRK-1, at 11-12. Please demonstrate that the proposed PBR plan meets the Department's standard of review for incentive ratemaking.

DTE 4-44 Refer to Exh. BSG/LRK-1, at 11-12. Please provide copies of any evaluation studies of the performance of price-cap PBR plans in Massachusetts and other jurisdictions regarding their effect on the rate of growth of distribution rates and distribution revenues. How successful have these plans been in enhancing productivity, promoting innovation, and reducing costs?

DTE 4-45 Refer to Exh. BSG/LRK-1, at 7-8. Please state the start and end dates of the Company's PBR plan. When will the last rate adjustment under the proposed PBR plan take effect?

DTE 4-46 Refer to Exh. BSG/LRK-1, at 7-8. Please explain how rates will be set under the proposed PBR plan.

DTE 4-47 Refer to Exh. BSG/LRK-1, at 7-8. Is the Company proposing to continue the PBR Plan on a year-to-year basis after the initial five-year term? Explain.

DTE 4-48 Refer to Exh. BSG/LRK-1, at 7-8. If Bay State is proposing to continue the PBR Plan on a year-to-year basis after the initial five-year term, will the Company notify the Department each year of its intention to continue with the PBR plan for another year? If the answer is in the affirmative, indicate the date on which the Company intends to notify the Department.

DTE 4-49 Refer to Exh. BSG/LRK-1, at 15. Please explain whether the proposed Z-factor in the Company's price cap formula applies to both exogenous cost increases and exogenous cost decreases as a result of (1) changes in tax laws, accounting principles, and regulatory, judicial, or legislative actions uniquely affecting the local gas distribution industry, and (2) cost changes that are beyond the Company's control and not accounted for in the GDP-PI term used in the Company's PBR formula.

DTE 4-50 Refer to Exh. BSG/LRK-1, at 16. How will the Company treat price-cap increases greater than the rate of inflation because of the recovery of exogenous costs?

DTE 4-51 Refer to Exh. BSG/LRK-1, at 16. Please indicate how the Company will compute the various components of the proposed price cap formula, including the source for the price inflation index (GDP-PI) used in the price cap formula.

DTE 4-52 Refer to Exh. BSG/LRK-1, at 18. Will the Company adjust its service quality plan to incorporate any changes or modifications to the Department's service quality guidelines set forth in D.T.E. 99-84 during the term of the PBR plan? Please explain.

DTE 4-53 Refer to Exh. LRK-1, at 17. Please define the meaning of "incremental costs" as is being used in this statement regarding the applicability of the PCI formula.

DTE 4-54 Refer to Exh. LRK-2, at 7. Does not the finding that Bay State's O&M cost trend "declined sharply while it was under the price freeze compared with the O&M cost trajectory before the freeze took effect" support the imposition of a rate freeze, rather than the adoption of a price cap PBR plan? Please explain.

DTE 4-55 Refer to Exh. LRK-2, at 18. Please:

(a) discuss the factors that determine "the number of gas distribution customers added [to an LDC's distribution system] in the last 10 years";

(b) discuss how the age of an LDC's distribution system is related to each of the above factors;

(c) discuss the ways in which acquisitions and mergers affect the age of an LDC's distribution plant as measured by the "system age" proxy;

(d) discuss how the inclusion of a poor or inappropriate proxy variable in an econometric cost model can affect the results of the study.

DTE 4-56 Refer to Exh. LRK-2, at 20. Refer to Exh. LRK-2 at 20. If the Gas Distribution O & M number in Row 1 is divided by the Number of Customers number in Row 2, a per customer O & M figure of .14 emerges for the U.S. sample and .25 emerges for Bay State, indicating that Bay State's per customer O & M is close to double that of the U.S. sample. Does this difference in sample characteristics between Bay State and the national sample have any influence on the predictive model derived to predict Bay State's O & M costs? If so, how would the model be effected?

DTE 4-57 Refer to Exh. LRK-2, at 24. Please indicate the degrees of freedom under which the t-statistic was assessed. Indicate also the significance cut off level for "T" with the degrees of freedom employed in the first test.

Dated: May 24, 2005